

# Farm Size and Labour Use: Analysis and Policy

Ashok Rudra

Amartya Sen

*The debate on size and productivity relations in Indian agriculture', which began with the publication of a note by one of the authors of this paper eighteen years ago, was joined by the other author six years later. Since then, many other scholars, including the present authors, have contributed to the debate.*

*The positions taken in the past by the present authors might have appeared sharply divergent, though the two authors themselves find that such was not the case, and that a common statement is possible on many issues involved in the debate. The present article is an attempt at such a common statement of position.*

## I

### Introduction

EIGHTEEN YEARS have passed since a note by one of the co-authors of this paper happened to be instrumental in starting off an intense debate on the so-called "size and productivity relations in Indian agriculture" (Amartya Sen, 'An Aspect of Indian Agriculture' *Economic Weekly*, Annual Number, February 1962). And a dozen years have gone by since two notes by the other co-author of this paper led to some vigorous questioning of the empirical regularities assumed in the debate (Ashok Rudra, 'Farm Size and Yield per Acre' and 'More on Returns to Scale on Indian Agriculture', *Economic and Political Weekly*, Special Number, July 1968, and October 26, 1968). The positions expounded in the past by the two co-authors of this paper might have appeared to be sharply divergent, and that impression would have been heightened by the assertive style chosen by both (see Amartya Sen, "Employment, Technology and Development", Clarendon Press, Oxford, 1975, Appendix C, and M Chattopadhyay and Ashok Rudra, 'Size-Productivity Revisited', *Economic and Political Weekly*, September 25, 1976). In reviewing the debate, the two authors find that their respective positions are not — and never have been — really very distant, and a common statement is possible on most of the issues involved in the debate. They also believe — without in any way decrying the importance of healthy mud-slinging — that such a common statement might serve some useful purpose since some obscurities seem to exist on these issues, especially related to policy implications.

This paper is not intended as a review of the debate on "Size and Productivity in Indian agriculture", which can be found elsewhere.<sup>1</sup> Nor does it attempt to cover the chief contentions of the main contenders, or to satisfy bibliographical curiosity.<sup>2</sup> Instead, the

aim is to view the main findings — both analytical as well as empirical — in the light of the original presentation of the issues, and to comment on their policy implications. Nearly two decades of research can be drawn on to sort out these issues.

## II

### Recall

In the two initiating papers by Amartya Sen ('An Aspect of Indian Agriculture, *Economic Weekly*, Annual Number, February 1962, and "Size of Holdings and Productivity", *Economic Weekly*, Annual Number, February 1964), the following were the main points made:

(i) *Prima facie inverse size-productivity relation* : In the average size-class data presented by the *Studies in Economics of Farm Management*, "in practically all the regions studied", it appears that "by and large productivity per acre decreases with the size of the holding". While in the absence of using "individual holding data to establish this conclusion, it is possible to be misled", and "the inverse relationship... is not yet something that can be taken to be a well-established fact", it was nevertheless tentatively accepted "with that reservation" (Sen 1964, p 323).

(ii) *Greater labour use in smaller farms* : "The total amount of family labour applied per acre goes up remarkably as the size falls, so that in spite of the fact that in some areas the amount of wage labour applied falls as the size gets smaller, the total amount of labour per acre is inversely correlated with the size of the farm" (Sen 1962, p 245). This is what one would expect due to the relative cheapness of family labour compared with wage labour, in the absence of "alternative employment opportunities" (p 246).

(iii) *Error in imputing market value to non-marketed resources* : It is a mistake to impute "to family labour a wage

equal to the market one", and "as economic concepts, 'profits' and 'losses' over total costs including the cost of family labour valued at the market wage rate, seem to be quite barren" (Sen 1962, p 246). This was a critique of the methodological framework used in the *Studies in Economics of Farm Management*, but did apply to some other works as well, which overlooked the fact that family labour might not readily have alternative wage employment opportunities. "No agricultural study... can go very far in India, if it does not focus attention on the systems of production underlying Indian agriculture", including the extent of use of family labour *vis-a-vis* wage labour.

(iv) *Critique of the efficiency of smallness* : 'In view of the fact that smaller farms have higher output per acre, can we argue that... small-scale farming is more productive? But that too does not seem to follow necessarily. If the explanation chosen here is correct, the factor that makes the crucial difference is not size as such, which is incidental, but the system of farming, *viz*, whether it is wage-based or family-based. For example, if a large co-operative farm operates on a non-wage family labour basis, there is nothing in our observations to indicate that it will have a lower output per acre. In fact in Indian private-enterprise agriculture, a whole lot of subsidiary operations are wage-based, e.g., building canals, dams, etc. A co-operative farm might be able to include some of these activities within the non-wage sphere, at least up to a point, with a corresponding gain in efficiency" (Sen 1962, p 246).<sup>3</sup>

Ashok Rudra joined the debate in 1968, after a number of important articles by — among others — Dipak Mazumdar, A M Khusro and C H Hanumantha Rao had already appeared taking the inverse size-productivity relation for granted, and seeking alternative explanations of the assumed phenome-

*Manufacturers of quality Papers & Boards*

**STRAW  
PRODUCTS  
LIMITED**

NEHRU HOUSE  
4, BAHADUR SHAH ZAFAR MARG  
NEW DELHI-110 002

***JK Paper—the best medium for your message.***

non. "On studying the disaggregated data of the Farm Management Survey", Rudra came to the conclusion that these data do not permit the generalised conclusions that have been drawn about the inverse size-productivity relation (Rudra 1966). A study of data collected by the Agricultural Economics Research Centre at Delhi University for 20 villages also led Rudra to conclude that at least for those sample observations the relation between "yield and farm size is spurious" (Rudra, *EPW*, Special Number, July 1968, p 1041).<sup>4</sup> In these two articles Rudra raised doubts on the general or universal validity of the inverse relationship between size and productivity and did not go into any of the explanations of the relationship if and when it held.

### III

#### Empirical Assessment

The totality of empirical research on the relationship between farm size and productivity has yielded a far from uniform picture.<sup>5</sup> Even those who have emphasised confirmation of the inverse relation *on the basis of individual household data* have noted failure to see such a pattern in several regions.<sup>6</sup> The general conclusion to emerge is the *diversity* of Indian agriculture, regarding the existence of the negative relation between size and productivity: "the negative relation may hold in certain parts of the country at certain times but not everywhere and not at all times".<sup>7</sup> It also appears that even when the inverse relationship holds, it may hold in certain ranges but not in others, and in many cases it is particularly noticeable "only for small size clashes".<sup>8</sup> While counting the different regions, one would find that the inverse relation is more frequently confirmed than rejected,<sup>9</sup> it would be a mistake to take it to be an empirical generalisation for Indian agriculture as a whole,

The evidence in favour of "greater labour use in smaller farms" seems to be much more uniform, and "smaller farms in almost all areas seem to devote a greater amount of labour per hectare of land not only for cultivating more crops on the same land but even for looking after the same crop".<sup>10</sup> When such greater labour use per unit of land fails nevertheless to yield a higher output per hectare, this would seem to be due to greater use of non-labour resources in larger farms.

Cheapness of labour in smaller farms is clearly among the more important in-

fluences permitting greater use of labour in such farms, though other influences (e.g., the superior quality of smaller holdings) are also relevant.<sup>11</sup> The cheapness of family labour reflects, among other things, the necessity of working hard for survival on the part of smaller peasants in a situation with rather limited opportunities of employment elsewhere.<sup>12</sup> The superior labour use of the smaller farmer reflects to a great extent the hard reality of their precarious existence.

The thesis of "the error in imputing market value to non-marketed resources" has been challenged by G R Saini (1971, 1979). "Our findings", says Saini (1979), "suggests that the market wage rate is in fact a real phenomenon and guides the decisions of farmers" (p 45), since "the results here are that the marginal product of labour is not only positive but also corresponds to the market wage rate" (pp 44-5). In this statement, Saini has been unduly modest, since he has 'over-proved' his contention. His 'results' yield not that the marginal product of labour "corresponds to the market wage rate", but that it is substantially *higher* than the market wage rate (in Uttar Pradesh in 1955-56 *nearly three times* the market wage rate, significantly different from unity at 1 per cent level)!

Saints results are obtained from fitting a Cobb-Douglas production function, estimating the elasticity with respect to labour, and then calculating the marginal product of labour for the geometric mean value of labour use.<sup>13</sup> The methodological absurdity of this approach has been discussed elsewhere.<sup>11</sup> Among other problems, the production function estimation is based on the assumption of *different* factor ratios, while the marginal product of each factor is obtained by taking a *given* factor ratio (in Saini's case the ratio of geometric means).<sup>15</sup> For the observed different factor ratios, Saini's estimated production function will yield widely varying values of the marginal product of labour.

Finally, Saini (1979) argues that "imputation of a value to owned land (which is almost invariably inherited by farmers from their forefathers) is highly arbitrary and usually does not enter into the farmer's calculations and decision-making in the short run" (p 122). It is worth remarking that if correct, this argument will be an application — not a disputation — of "the error in imputing market value to non-marketed

resources". But it is not at all clear that the argument is valid, since what is relevant is not whether the farmer inherits his land from his forefathers but whether the farmer can market his land and take the marketing opportunities into account in his calculations. It is not at all obvious that the selling or renting of land suffers from similar barriers to the selling of labour power arising from insufficiency of wage employment opportunities, to

### IV Policy

The size-productivity inverse relation can be — and has been — put forward as an argument against large-scale farming, both of the capitalist as well as of the co-operative variety. "Many erstwhile supporters of the co-operative movement have now turned into supporters of peasant farming, drawing consolation from the thought that large-scale farming is not after all necessary for dynamism in agriculture" (Chattopadhyay and Rudra 1976, p A-115).

It is important to distinguish between capitalist and co-operative farming despite the possible similarity of large scale. Even when it is accepted that capitalist farming provides by and large a lower utilisation of labour power, nothing about co-operative farming emerges from that observation. Size of farm is a very general variable and to treat it as the only significant parameter in affecting the utilisation of labour power would be a mistake. In fact, even in the initial statement on the size-productivity inverse relation (Sen 1962), it was noted that size might well be 'incidental', and merely correlated with the system of fanning, in particular with the use of hired labour (p 246). In so far as co-operative farming is run as a communal operation, it will have more in common with family farming than with capitalist farming, and indeed in co-operative fanning it might even be possible to extend the advantages of the family mode to "subsidiary operations, eg, building canals, dams, etc" (Sen 1962, p 246)."

The assessment of the co-operative mode of production would require information directly relating to that mode. It cannot be deduced from something as remote as the general relations between size and productivity obtaining in the past, or indeed now, in Indian agriculture — be it inverse or not.

The empirical findings are, however,

of somewhat greater relevance to discussions on the existing modes in Indian agriculture. In so far as smaller farms, and in particular more family-labour using farms, provide more intensive utilisation of labour power, the replacement of such farms by larger, capitalist farming may be seen as making labour use that much more difficult, quite aside from the immiserisation of the rural poor that capitalist development might produce.

On the other hand, in so far as smaller farms, despite more intensive use of labour power, do not succeed in having a higher output per acre, the superior ability of the large farmer in marshalling non-labour resources must be considered to be important. The advantages of peasant cultivation (chiefly in labour use) has to be balanced against its disadvantages (chiefly in the use of capital), and there is no case for seeking the salvation of Indian agriculture, as some have done, in cutting up holdings into smaller units in pursuit of greater efficiency.

While the tendency towards greater labour use in family-based farms than in wage-labour farms has been observed in richer countries as well, the precarious nature of the existence of marginal and smaller farmers in India forces them willy-nilly to more intensive effort, which adds a further dimension to the question. The need for greater marshalling of non-labour resources in lifting the cultivators from this precarious position is particularly acute in India. It is clear, however, that the policy of trying to provide this through replacement of peasant agriculture by capitalist agriculture would be inept — both in terms of disadvantages of labour use (discussed above) as well as in terms of exposing erstwhile peasants to greater economic insecurity. Wage labourers are typically much more exposed to deprivation and destitution than peasants owning some land, and indeed they are particularly vulnerable to starvation and famines.<sup>18</sup> In this context, too, the greater security of basic entitlements that can be provided by a properly functioning co-operative mode must be considered seriously.

In the current policy discussions, "the alternatives seem to have reduced themselves to two — viz, small-scale peasant farming and large-scale capitalist farming", and "that there was a third alternative — viz, that of co-operative farming — seems to have com-

pletely disappeared from public memory."<sup>19</sup> A revival of discussions on farm size, production modes and resource-use in Indian agriculture can contribute substantially only if the choices are not artificially restricted. The problems, deep-rooted as they are, call for the examination of far-reaching solutions, going well beyond institutional forms already common in Indian agriculture.

### Notes

- 1 Aside from Sen (1975) and Chattpadhyay and Rudra (1976), see also Krishna Bharadwaj, "Production Conditions in Indian Agriculture", Cambridge University Press, 1974, and G R Saini, "Farm Size, Resource-Use Efficiency and Income Distribution", Allied Publishers, New Delhi, 1979.
- 2 Saini (1979) provides an extensive bibliography. An important omission, however, is N Bhattacharya and G R Saini, 'Farm Size and Productivity: A Fresh Look', *Economic and Political Weekly*, June 24, 1972.
- 3 These were the main points made, though several other subsidiary issues were taken up, including a critique of the explanation of the inverse relation in terms of 'technological diseconomies of scale', and an exploration of the economic process that could make smaller farms typically *more fertile* than the larger ones (see Sen 1962, 1964).
- 4 This latter work extended an earlier study by A P Rao of data for five villages collected by the same Centre, which again did not reveal any noticeable inverse relation ('Size of Holding and Productivity', *Economic and Political Weekly*, November 11, 1967).
- 5 The various studies have been critically surveyed by Bharadwaj (1974), Sen (1975), Chattpadhyay and Rudra (1976) and Saini (1979).
- 6 See, for example, Bhattacharya and Saini (1972) and Saini (1979, p 109).
- 7 Chattpadhyay and Rudra (1976, p A-109).
- 8 Chattpadhyay and Rudra (1976, p A-109), and also M Chattpadhyay and A Rudra, 'Size Productivity Revised: Addendum', *Economic and Political Weekly*, March 12, 1977.
- 9 See Rudra, EPW, October 26, (1968), Bhattacharya and Saini (1972), Chattpadhyay and Rudra (1976, 1977), and Saini (1979).
- 10 Chattpadhyay and Rudra (1976, p A-111), See also Chattpadhyay and Rudra (1977).
- 11 See Chattpadhyay and Rudra (1976, p A-114).
- 12 See Sen (1962, p 246).
- 13 Saini (1979, Chapters 3 and 4).
- 14 See Ashok Rudra, 'Allocation Efficiency of Indian Farmers: Some Methodological Doubts' *Economic and Political Weekly*, January 6, 1973; also Sen (1975, pp 150-1).
- 15 Interestingly enough, even Saini's estimated ratios of marginal product of labour (at the geometric mean factor ratios) to the market wage rate, while always higher than unity, invariably *decrease* as we move from "large farms" to "medium farms" and thence to "small farms" (Saini 1979, Tables 4.2 and 4.4., pp 60 and 64), and also as we move from high hired-labour-using farms to medium hired-labour-using farms, and thence to low hired-labour-using farms (Saini 1979, Tables 4.6 and 4.8, pp 68 and 72). This would indicate support for the view that labour cost goes down as we move to smaller farms and those more dependent on family labour. But no real importance should be attached to this support, in view of the methodological weaknesses of the entire approach.
- 16 Of course, the labour and land markets cannot be viewed separately from each other in the context of over-all equilibrium, and gaps in the labour market may be thus indirectly connected with limitations of the land market; see Amartya Sen, 'Peasants and Dualism with or without Surplus Labour', *Journal of Political Economy*, Volume 74 (1966), p 441, and Pranab Bardhan, 'Size, Productivity and Returns to Scale: An Analysis of Farm Level Data in Indian Agriculture', *Journal of Political Economy*, Volume 81 (1973), p 1385.
- 17 Co-operative labour has been used with great success in such 'subsidiary' operations in China — a fact that should not be overlooked in the turmoil created by the current debates in China on the merits of the cultural revolution and of communal rural existence. See Sen 1975. pp 86-7.
- 18 See Amartya Sen, 'Famines as Failures of Exchange Entitlement', *Economic and Political Weekly*, Special Number, 1976, and 'Starvation and Exchange Entitlement: A General Approach and Its Application to the Great Bengal Famine', Cambridge Journal of Economics, volume 1 (1977); also "Poverty and Famines: An Essay on Entitlement and Deprivation," prepared for the ILO World Employment Programme, to be published by Oxford University Press.
- 19 Chattpadhyay and Rudra (1976, p A-115).